

A framework for Strategic planning in Iran's Oil Industry

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Abstract - The aim of this study is present a framework for strategic planning. On this basis, the oil industry was selected as the spatial domain. In this study, in order to implement the strategic planning, since IT is an inevitable part of today's businesses, we focused on aligning business strategic planning in the oil industry and strategic IT planning. First, to analyze the data, strengths and weaknesses, opportunities and threats in the oil industry were analyzed using the SWOT model. Then, appropriate strategies in the oil industry were identified by using the combination of the Balanced Scorecard method and strategic alignment model, according to the SWOT matrix and causal relationships were drawn and finally, the strategies were rated using TOPSIS technique in order to improve resource allocation and reduce the complexity of decision-making for managers.

Keywords - strategic management; strategic alignment; Balanced Scorecard; TOPSIS technique

1. INTRODUCTION

Organizational performance is greatly influenced by the globalization process, development of information technology and information systems. This progress has been very influential on the decision-making process and organizational strategies and tactics. In addition to the globalization process, virtualization in business environments has led to many changes in the organizational approach, so that many organizations and companies restructure their value chain and establish closer ties with customers and co-workers (Ahan, 2011)[5]. Due to the profound development and progression of information technology in organizations and the new opportunities created by this technology and it cannot be regarded as one of the components that affect the organizational business; but, today, this technology has created new opportunities and has changed lives of human beings and for that reason, institutional business is extremely influenced by the technology (Avison, 2014)[6]. Thus, it can be argued that IT is influenced by business and its logic and business is affected by information technology and its developments. Using properly, comprehensive and innovative of these facilities and opportunities requires updated information, careful planning and efficient management. The most important issue which is important in this area and affected other issues, is the need to align the IT strategy and business strategy (Buytendijk et al., 2016)[8]. Through this strategic alignment, we ensure that information technology and information systems fully support the organization's business and moreover, the business supports information technology. Thus, we are confident that we can use all the facilities and opportunities

available in IT in order to achieve organizational goals and turns information technology into a competitive advantage within the organization (Gunasekaran, 2006)[10]. The creation of an integrated framework to manage strategies in these two areas seem necessary. This framework should ensure alignment of business strategies and IT strategies and in addition, must ensure that these strategies are aligned with organizational major policies (Huang et al., 2016).

On the other hand, the oil industry is one of the basic industries in oil-rich countries and this has a long history in Iran due to the different demographic, biological and climatic variables. Huge volume of oil transactions and products derived from crude oil express the need for identifying a precise scientific methods in this field (Ali Ahmadi, 2004)[2].

Despite the oil refining industry in Iran dating back decades and the development of scientific methods to refine and optimize operations, the refineries strategic planning and performance evaluation in Iran still has many weaknesses.

So, the question arises with respect to the above: How is the appropriate model for strategic management at the National Iranian Oil Products Distribution? What should be the prominent feature of this model to meet the needs of organizations in the field of strategic management? Through the formulation of strategies, action plans and establishing attainable goals, this will create a basic framework for management strategies and monitoring organizational performance and update the management process by obtaining feedback. It can be considered as a basis for assessing organizational performance in various units and projects due to the formation of this framework is based on the Balanced Scorecard. Then using two

factor analysis, the strategies are reviewed in order to select strategies that have more impact on organizational goal and then, these strategies are prioritized using multi-criteria decision-making techniques.

2. THEORETICAL FOUNDATIONS

According to "Henderson, Venkatraman", strategic alignment means integration of business strategies, IT strategies and information systems (Henderson, Venkatraman, 1999). A survey conducted by Bergeron and his colleagues in the literature indicate the fact that the idea of strategic alignment that is derived from several theoretical and practical research indicates that organizational performance is the outcome of proportionality between several domains (Bergeron et al., 2004)[7]. The most important areas are organizational strategy and organization structure. This fitness is based on trying to maintain alignment between the organization and its external environment and providing resources to support this alignment. Organizational structure should fit well with its strategy to create competitive advantage (Lansiluoto, 2015)[15]. The strategic changes in the organization needed more information and are able to process it. Organizations to operate more efficiently, when there is coordination between the requirements of processing of information for strategy and information processing capabilities. Information processing requirements expresses IT strategies and information processing capabilities expresses the structure of the IT (Wons, 2009)[24]. Study the literature on information technology suggests that if business strategies and IT strategies are not aligned within organizations, these organizations cannot succeed and lose their ability to compete (Stewart, 2007)[20].

The alignment among strategic business and IT strategies increases the impact of information technology in organizations and as a result, it would increase business profitability (Wiersma, 2015)[23].

On the other hand, inability to use information technology can prevent the proper functioning and survival of the organization would be very difficult (Quezada et al., 2009)[19]. The researchers suggest that the alignment increases the likelihood of developing the necessary systems for the organization and compel top executives to support the field of IT (Creamer et al., 2015).

Papalexandris and colleagues suggest that, through the alignment between strategies and infrastructure, organizations can increase their synergy and further, it also facilitates business development and also increases efficiency and profitability. However, before this is often strategic alignment is viewed as a target, in new research, strategic alignment is considered as a dynamic and iterative process (Martinsons, 1999)[16]. These benefits will allow managers to focus on applications of information technology for competitive advantage using

the original skills and technological fields (Papalksandrys et al., 2014)[18].

According to what was said, Alignment can be the key to improving profitability through information technology. This alignment means strategic fit between strategy and infrastructure as well as business and IT integrity (Mc Naughton et al., 2016). But strategic business management is one of the main concerns of managers and directors of these units throughout history. Performance appraisal system throughout history have always been based on financial criteria. These financial criteria have historically been faced with change and growth (Kaplan and Norton, 2005)[13].

Because, according to many managers and planners in organizations, use and harness the power of information technology for the long-term interests is very difficult.

The proper use of the growing potential of information technology and information systems be provided by aligning business and IT strategies (Wall, 2003)[22].

As we know, the data turn very quickly into information, information becomes knowledge and knowledge is a bridge towards progress. Progress requires goal setting, planning, resource allocation, time, manpower, and we must do research in various fields to move towards progress and the results used in the community in order to achieve sublime society. There are various methods for this purpose and method of assessment and balanced scorecard is one of them (Kaplan and Norton, 2004). On the other hand, balanced scorecard and strategy of map should be considered as a powerful tool for managing the strategies and as a system to support decision-making at the management level and short-term goals and the balance between external stakeholders and internal factors (Thompson et al., 2013)[21]. We know that the activities of an organization should be in the direction of the organization's overall vision and policies and you can be sure of being in line with the policies of the organization's overall strategy using this framework (Nyon, 2007). This framework is shaped by a combination of strategic alignment model that attend to establish a strategic alignment between business and IT domains and the Balanced Scorecard as a tool for management strategies in organizations faced with global appeal.

3. RESEARCH METHODOLOGY

The method of research is descriptive - survey and in terms of purpose, it is an applied research. The data collection tool is questionnaire and content analysis was used to confirm the validity and Cronbach's alpha coefficient was used for confirming its reliability. The statistical population included all managers and experts in Petroleum Engineering National Company and Cochran formula was used to determine the sample size which is mentioned below. The method is simple random sampling.

$$n = \frac{N \times z^2 \alpha/2 \times p \times q}{\epsilon^2 \times (N - 1) + z^2 \alpha/2 \times p \times q} = \frac{100 \times (1.96)^2 \times 0.5 \times 0.5}{(0.05)^2 \times 99 + (1.96)^2 \times 0.5 \times 0.5} \approx 79$$

The sample size is 79 and accordingly, 85 questionnaires were distributed among the statistical population, among which 79 questionnaires were usable and correct.

4. DATA ANALYSIS

SWOT analysis is one of the most important tools in the analysis and strategy formulation. SWOT analysis was initially offered in this section.

Table 1: Strengths of oil industry

No.	Strengths
S1	Having a young, talented and motivated workforce
S2	Ability to define research projects and the production of knowledge
S3	Existence a strong partner companies
S4	Full cycle implementation for IT components in company

Table 2: Weaknesses of oil industry

No.	Weaknesses
W1	Lack of appropriate facilities to attract and retain skilled manpower
W2	Lack of appropriate and targeted marketing process
W3	Lack of knowledge management system
W4	Lack of precise definition and proper working conditions with trade partners
W5	Failure to identify suitable foreign partners to deploy in national projects
W6	The impossibility of continuing education requirements with the right conditions for the development and maintenance of elite human resources
W7	Lack of standard project management system includes risk management and lack of a cost projects

Table 3: Opportunities of petroleum industry

No.	Opportunities
O1	General tendency to use information technology and infrastructure in this area
O2	Customers positive comments about the services offered by the company
O3	Deposition of partner companies in the enterprise architecture

Table 4: Threats of oil industry

No.	Threats
T1	The possibility of leaving professional and experienced manpower
T2	Failure to take advantage of foreign partners in the project due to sanctions
T3	Dissemination of knowledge and expertise-driven products to competitors
T4	Time-consuming IT infrastructure activities and their tendency to quick impact projects

After SWOT analysis, the developed strategies were transferred into the strategy map and each of them was placed in its proper place and position. Consequently, in order to complete the strategy map using the model provided by Kaplan and Norton and by exploring the causal relations for the realization of each of the strategies, the strategy map was completed and the strategies were put in their correct place.

Programs and strategies needed for achieving strategies at a higher level or in the field of information technology were assessed. Thus, along with complementary strategies

in the strategy map, the causal relations between them were drawn.

In the following figure, the map of strategic alignment for the oil industry is provided. In this figure, the business area is on the left side and the field of IT is on the right side.

In addition, these four landscapes are drawn in each field based on causal relations and the strategies are written within the rectangle. Each strategies has a number and this numbering is done based on the SWOT analysis. Finally, strategies are reviewed in this map and causal relations between them is expressed.

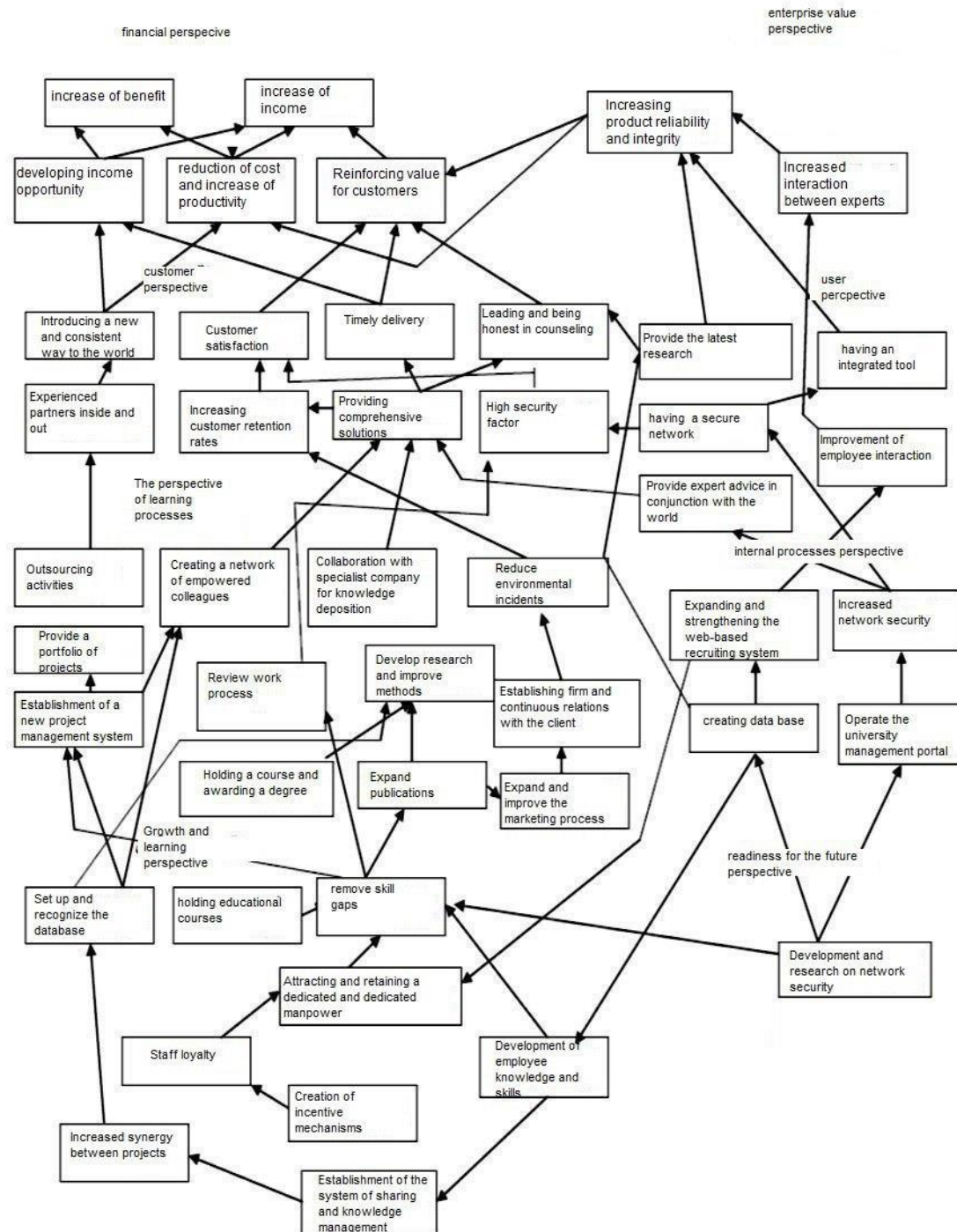


Figure 1: Strategy map in the oil industry

5. PRIORITIZE STRATEGIES

Another finding of this study is to prioritize strategies that have been obtained using TOPSIS method. TOPSIS technique developed by Huang and Yun based on the original. According to this technique, the choice should have the minimum distance from the positive ideal solution and the maximum distance from the negative

ideal solution. To this end, the following steps be considered:

First step: obtain the weighting of criteria using the Shannon entropy

The data decision matrix is completed with 23 strategies and 8 criterion by the statistical population in the following table in which the numbers are allocated according to the importance of each criterion in the company's strategy.

Table 5: The data decision matrix (Source: researcher's calculations)

Preparing for the future	Internal IT	User	Business Value	Growth and learning	Internal processes	Customer	Financial	
1	3	3	5	1	3	5	7	S1
1	3	3	7	1	5	5	7	S3
7	5	7	9	7	7	7	7	S4
5	7	7	5	5	7	7	5	S5
7	7	7	7	7	7	9	7	S6
7	7	7	7	7	7	9	9	S7
7	7	7	9	7	7	9	9	S9
7	7	7	5	7	9	5	7	S10
7	7	7	7	7	7	9	7	S11
3	5	7	7	5	7	9	5	S13
7	7	3	7	7	7	5	7	S14
7	7	7	9	7	7	7	9	S15
7	9	7	9	7	9	7	9	S16
3	7	7	5	3	7	7	5	S17
5	7	9	7	5	7	9	7	S20
5	7	9	7	5	7	9	7	S21
7	9	7	7	7	9	7	7	S22
9	9	7	7	9	9	7	7	S23
9	9	5	5	9	9	5	5	S26
9	9	5	7	9	9	5	7	S27
9	9	7	5	9	7	7	5	S29
9	9	5	7	9	9	5	7	S31
9	5	3	7	9	5	3	7	S32

After applying the Shannon entropy method, the results were written in Table 4 in which X8 had the highest weight and X5 have the lowest weight.

Table 6: Weights of criteria (Source: researcher's calculations)

X8	X7	X6	X5	X4	X3	X2	X1	
0.214	0.136	0.1	0.036	0.207	0.086	0.128	0.093	Wj

This final matrix revealed that which of the criteria for determining the type of corporate strategy are more important or have the most influence over the implementation and success of a strategy.

Second step: implementation TOPSIS method

First of all, for applying this model, the decision matrix should be Scale with the help of Euclid Norm according to equation (1).

$$R_{ij} = \frac{a_{ij}}{\sqrt{\sum (a_{kj})^2}} \quad \text{eq 1}$$

The weight diagonal matrix and scale weighted matrix can be achieved. and in the next step, the sets for the positive ideal solutions and the negative ideal solutions

should be determined and the distance of each strategy is calculated based on Eq 2 and 3.

$$SI^+ = \sqrt{\sum (a_{ij} - A^+)^2} \quad \text{eq 2}$$

$$SI^- = \sqrt{\sum (a_{ij} - A^-)^2} \quad \text{eq 3}$$

Then calculate the amount of Ci obtained using the following equation.

$$CI = \frac{s_i^-}{s_i^- + s_i^+} \quad \text{eq 4}$$

Table 7: Calculate the relative proximity (Source: researcher's calculations)

Calculate the relative proximity	
0.1	C1
0.1	C3
0.75	C4
0.53	C5
0.79	C6
0.79	C7

0.79	C9
0.75	C10
0.79	C11
0.45	C13
0.70	C14
0.81	C15
0.85	C16
0.35	C17
0.58	C20
0.58	C21
0.84	C22
0.91	C23
0.80	C26
0.80	C27
0.82	C29
0.83	C31
0.58	C32

And finally, the existing options can be rated according to the descending order based on CI. Considering the Planning and decision-making, this option prioritize in order to achieve the objectives or increase the effectiveness.

Table 8: Prioritizing strategies (Source: researcher's calculations)

Priority	Strategy
1	Development Research
2	Outsourcing Activities
3	Cooperation with specialized companies in order to precipitate knowledge
4	Increase synergies between projects
5	Attract and retain skilled manpower
6	Provide portfolio
7	Remove skill gaps
7	Set up and equip the database
9	Customer satisfaction
10	Providing new ways and to keep pace with the world
11	Timely delivery
11	Leading being honest with advice
13	Reduce costs and increase productivity
13	Have experienced partners inside and outside the country
15	Create a network of competent partners
16	Creating incentive mechanisms and improve compensation system
17	Strong and ongoing relationship with the customer
18	Expanding and improving the marketing process
19	Strengthening value for customers
20	Providing comprehensive solutions
21	Revision of work processes in order to increase security
22	Develop revenue opportunities
23	Increase profits

6. RESEARCH RESULTS

This study was carried out in order to establish a new framework for strategic management and information technology-based business management strategies and create strategic alignment between these two areas in Iran's oil industry based on the Balanced Scorecard and strategy maps. To do this research, the research literature related to the Balanced Scorecard and its evolution was investigated as a strategic management system. In this part, the Balanced Scorecard which had proposed by

Kaplan and Norton, was investigated as a method of performance evaluation and its evolution towards strategic management system was provided. Finally, the strategy map, the proposed perspectives and also the causal relationships examined.

On the other hand, we searched the literature for finding the mild approaches that use the Balanced Scorecard to manage strategies of information technology, the Balanced Scorecard framework for information systems which had provided by Martinsons and his colleagues was also investigated. Other activity in the field of literature

review was reviewing the literature about strategic IT plans and IT management strategies.

After this, the necessity of establishing alignment between IT and business strategies were studied from various aspects. In addition, the strategic alignment model provided by Henderson and Venkatraman was investigated. In short, the new framework proposes using the business strategy map and IT strategy map alongside each other and establishing causal relations between the strategies in these two fields to establish strategic alignment. A framework has been proposed to use it in organizations to determine the status of this framework in organizational planning process.

In this study, after reviewing the literature in the field of IT strategic planning and alignment of business and IT strategies, it was found that despite present a comprehensive model regarding the strategic alignment by Henderson and Venkatraman and provide a complementary framework in this regard, yet how to operate this model and how to monitor the alignment over time is not obvious. Although the strategic alignment model presented a framework for strategic thinking and align business and IT strategies, but the problem of managers for measuring alignment and monitoring processes in line with the strategies still remains. In addition, the review of the literature in the context of Balanced Scorecard and the strategic maps suggests that this approach has encountered with wide acceptance as a means to align organization and executive plans with the perspectives and organizational strategies.

Considering the approach of this method which was aligning the organization at the lower levels and within the organization with the strategies and the areas outside the organization, this method is a suitable model for the implementation and operationalization of strategic alignment model.

On the other hand, several studies that had been done regarding the implementation of the Balanced Scorecard in the Performance Evaluation and IT management, supported the possibility and necessity of such an approach in management strategies and monitoring organizational performance in the field of information technology.

Through the establishing the strategic alignment model, two maps are presented for the areas of business strategy and information technology. Then the possibility of establishing such a framework has been investigated and the following results were obtained:

1. The perspectives presented in the Balanced Scorecard method have many similarities to these fields and their components in the strategic alignment model. Customer perspective matched with the external field in the alignment model and internal process perspective matched with the learning and development perspective in the strategic alignment model.
2. Establishing strategic fit between domestic and external fields in the strategic alignment model is created through the causal relationships between strategies into four

perspectives of the strategy map. Because in fact causal relations of the strategy map suggests that strategies at higher levels (financial strategy and customer and market strategy) can be accomplished through strategies and mechanisms at lower levels (internal processes and learning and growth) and therefore, the alignment of these two fields can be explained.

3. Establishing operational integration between business and IT domains in the strategic alignment model can be obtained through the causal relationship between the strategic plans related to business and IT. Thus, this connection would indicate that IT supports the business strategy.

Also, given that the proposed framework is based on the strategy map and the Balanced Scorecard and follows its desired model, two conclusions can be made:

1. Establishing strategic alignment based on strategy maps ensures that the organizational strategies in the two mentioned fields are in accordance with the organizational missions, perspectives and macro policies. Because operational approach starts from the perspective and missions and the organization is aligned on the basis of this policy.
 2. Using the strategic alignment based on the strategy maps creates the basis for monitoring and evaluating the performance of the organization's processes and projects. Using the base created by this framework at a later stage, the strategies turned into operational plans and the achievable objectives can be specified and the system can be used as a strategic management system and monitoring organizational performance continuously reviewed.
- Finally, it should be noted that the proposed framework was based on the related literature and the proposed solutions in the field of strategic management based on the Balanced Scorecard, Strategy Maps and other issues, created to meet the needs in the field of strategy alignment and operationalization of the strategic alignment model.

The research on management of IT strategy and its alignment with the business strategy have some innovations in the following areas:

The possibility of using the balanced scorecard and strategy map to establish the strategic alignment model. Thus, a conventional and practical method with scientific background and extensive experience in this regard has been proposed.

Use the four perspectives of the Balanced Scorecard to manage strategy and business plan and the corresponding perspectives of the balanced scorecard for information systems for design and management of IT strategies instead of domains and components considered in the strategic alignment model.

Use the causal relationships between the four perspectives of the Balanced Scorecard to establish a strategic fit.

Use the causal relationships between the business strategy map and the organizational strategy map to establish operational integrity.

It also suggests a framework for organizations to prioritize strategies for an increased focus on the value creation strategies in the organization. Considering the prioritization done in this paper once again remind that focus on the value of intangible assets in today's organizations is increasing day by day and converting intangible assets into tangible assets can lead to profitability and survival of the organization.

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